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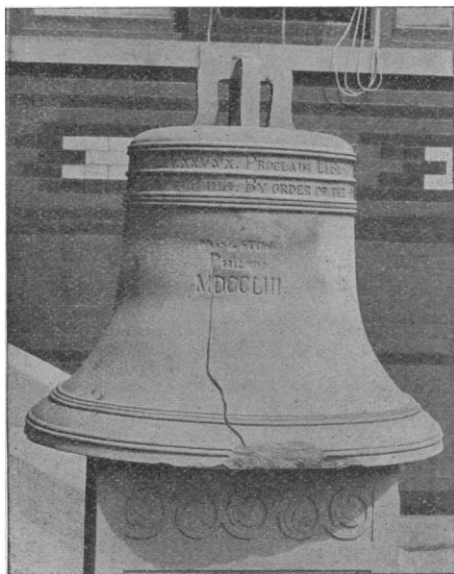
successfully except a mischievous urchin who had been thrashed for saying *what*, and his answer was, 'Give me that stick and I'll *what* you.'

ERASMUS DARWIN PRESTON.

(*To be continued.*)

SANDSTONE DISINTEGRATION THROUGH THE FORMATION OF INTERSTITIAL GYPSUM.

A BLOCK of Carboniferous sandstone from New Brunswick, carved in the form, and in imitation, of the Old Liberty Bell, was some years ago, owing to the crowded condition of the Exhibition Halls of the National Museum in Washington, removed to a point near the northwest entrance, outside of the building.



When placed in position the stone was fresh, and surface smooth throughout. Within the space of a couple of years there appeared on the northwest side a slight roughening of the surface and a whitish efflorescence which during the two ensuing years extended gradually two-thirds around the northern and southern sides, but was always most marked on the northwest.

On examination the efflorescence was found to be due to the formation of small gypsum crystals, and the roughening of the surface to the falling away of the siliceous granules. The process has gone on until now more than an eighth of an inch in thickness of material has been removed from the point of surface first attacked, and the inscription in part obliterated, as shown in the accompanying illustration. It is to be noted that the zone of disintegration is limited wholly to that portion of the bell just above the middle, where the surfaces stand nearly vertical, while elsewhere the material is almost as fresh and unaltered as when first exposed.

An examination of the stone shows it to contain numerous small segregations of marcasite which are quite inconspicuous, or show up as small dark spots on the weathered surface. Chips of the fresh rock effervesce slightly in dilute acid, indicating the presence of calcite. The disintegration is doubtless due, therefore to the oxidation of the marcasite through the downward percolation of rain water, and the reaction of the sulphuric acid formed upon the calcium carbonate. The resultant calcium sulphate is then brought to near the surface by capillarity where it crystallizes, and, as growth takes place always from the base of the crystals the sand granules are gradually forced off in the manner so often exemplified in the lifting of soil through the formation of hoar frost. The writer has described (Proc. U. S. Nat. Mus., Vol. XVII., 1894, p. 80) the splitting of blocks of limestone through similar gypsum growths, as noted in the dry portions of Wyandotte and Mammoth Caves, but has never seen the phenomenon so well illustrated in sandstone as here. In as much as it offers an explanation for the disintegration of sandstone of this type where exposed in the walls of buildings, the case is worthy of mention.

The gypsum efflorescences, it should be

noted, have the plumose and curved forms occurring in the rosettes of the caverns mentioned.

GEORGE P. MERRILL.

THE NATURE OF THE SMILE AND LAUGH.

A DEFINITION of the smile and laugh is not needed by any one, for to every human being it is a self-evident birth-right, an axiomatic fact. Nor in general does this phenomenon (we shall consider in this essay the smile as only a lesser degree of the laugh) need description, and for the same reason. But the nature of the smile and laugh psychophysiologically does need explanation, why it is as it is and not otherwise. We shall try then here to look a little at the biological character of this incident of our common experience.

Herbert Spencer in his famous essay on 'The Physiology of Laughter' (1860), suggests as the occasions of the laugh, these: The ludicrous, joy, sardonic stimuli, hysterical states, mental distress, tickling, cold, and some acute pains. It seems, however, that pure or typical smiling and laughter comes from what is best termed joy, alone. It is only by inaccuracy of observation and a deficient consideration of certain facts that that smile-like expression of the face occasioned by 'sardonic stimuli,' mental distress, and acute pains is termed a smile, for while it is obvious, indeed, that the facial 'expression' of this tone of feeling is somewhat like that of unalloyed pleasantness, yet there are differences. These differences are chiefly in the mouth in the way of a greater uncovering of the upper teeth, with a different look about the eyes, the total appearance being harsher, in a way hard to particularize but very easy to feel. The so-called laughter of really painful states, at best only rarely observed, seems to depend on the well-established affective principle that the extremes of contraries tend to produce like effects,

probably through the occurrence of wide radiation in the cortex, as would be expected when the stimulus is on the verge of abnormality of strength. Again, it must be remembered that so perfect and sensitive is the neuromuscular mechanism in question that even in an experience which is chiefly unpleasant or painful, even a momentary idea of any sort, or a brief cessation of the pain (in itself a pleasantness), would serve as the occasion of a true smile and so complicate the expression, giving it more the look of a properly occasioned smile. Tickling, on the other hand, is essentially pleasant if not too long continued; and it is characteristic of hysteria in a marked degree that it simulates arbitrarily every known emotion to perfection, or rather is in itself a versatile emotional state. It seems proper then to consider the laugh and smile as concomitant properly only to pleasantness or to pleasure, whether this affective tone be derived from purely conceptual relations, as in humor, or from stimulation of whatever bodily organs are in their action concomitant to pleasure.

One may observe even within the first week of the post-natal life of the infant that the eyes and especially the mouth display at times an incipient smile, the purely reflex or mechanical accompaniment of a true sensational pleasantness, arising usually from the normal functioning of the digestive process. A very few weeks later (two, as I have observed in one infant), the consciousness has become so far familiar, so to say, with its organism, as to bring out nearly if not quite in all its adult details the action of the inborn intricate mechanism of nerve and muscle. The 'hearty laugh' does not seem to occur until a somewhat later period, aloud and briefly perhaps by the end of the eighth week, but as a general bodily process not before two or three years of life have passed; this is not, probably, because of any incompleteness in the ap-